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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/727,662	12/05/2003	Jiro Matsumoto	F00ED0150-DIV	4972
26071	7590	08/28/2006	EXAMINER	
JUNICHI MIMURA OKI AMERICA INC. 1101 14TH STREET, N.W. SUITE 555 WASHINGTON, DC 20005			PHAM, LONG	
			ART UNIT	PAPER NUMBER
			2814	

DATE MAILED: 08/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

3/

Office Action Summary	Application No. 10/727,662	Applicant(s) MATSUMOTO, JIRO	
	Examiner Long Pham	Art Unit 2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,5-33,35-44,46,48,50,52,54,56,92 and 93 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 43 and 44 is/are allowed.
- 6) ☒ Claim(s) 1,2,5-33,35-42,46,48,50,52,54,56,92 and 93 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

The indication of allowability of claims 1-2, 5-33, and 36-56 in previous office action has been withdrawn.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 6-28, 32-33, 37-42, and 45-56 are rejected under 35 U.S.C. 102(b) as being anticipated by Miyajima (JP 2000-299335).

Regarding claim 1, Miyajima discloses in Figs. 14-17 a sealing apparatus for sealing a semiconductor wafer 90 having semiconductor elements on its surface by resin 50, comprising an upper mold 20; and a lower mold 21 having a first area where the semiconductor wafer is mounted, wherein the lower mold having an uneven surface, which is formed within a second area, which is in the first area, and wherein the uneven surface is not formed in the periphery of the first area, as shown in Figs. 1, 16 and 17.

With respect to claim 2, how the uneven surface is formed has not been given patentability weight since claimed invention is directed to a device.

Regarding claim 6, Miyajima discloses in Fig. 17 that slits 98, 76a, 98a, and 77 form the uneven surface.

Regarding claim 7, Miyajima discloses in Fig. 17 that the slits 76a are formed in parallel to each other.

Regarding claims 8 and 9, Miyajima discloses in Figs. 16 and 17 that in the

sealing apparatus the area is a first area 21, the slits are formed within a second area, which is in the first area, and the slits are not extended to the periphery of the first area.

Regarding claim 10, Miyajima discloses that the uneven surface is formed by a single spiral slit 98, as shown in Figs. 16 and 17.

Regarding claim 11, Miyajima discloses in Fig. 17 that the area is a first area the single spiral slit 98 is formed within a second area, which is in the first area, and the single spiral slit 98 is not extended to the periphery of the first area.

Regarding claims 12, and 13, Miyajima discloses in Fig. 14 a sealing apparatus further comprising a shock absorbers 78, which are formed under the lower mold 21, buffering stress from the upper mold 20 when the semiconductor wafer is sandwiched by the upper and lower molds, the shock absorbers being disposed symmetrically against the center of the area.

Regarding claims 14 and 15, Miyajima discloses that the shock absorber 78 is formed by a metallic compression spring.

Regarding claims 16, 17, 20, and 21, Miyajima discloses in Figs. 14 and 1% that the shock absorber 78 is a first shock absorber 78, and further comprising a first block 74 having a first recess, the lower mold 21 being contained in the first recess; a second block 76 having a second recess, the first block 74 being contained in the second recess; and second shock absorbers, as shown in Fig. 19, which are formed under the second block, buffering stress from the upper mold when the semiconductor wafer is sandwiched by the upper and the lower mold.

Regarding claims 18, 19, 22, and 23, Miyajima discloses that the second shock absorbers are formed by a metallic compression spring as shown in Fig. 19.

Regarding claim 24, Miyajima discloses in Figs. 14-17 a sealing apparatus for sealing a semiconductor wafer 90 having semiconductor elements on its surface by resin 50, comprising an upper mold 20; and a lower mold 21 having an area where the semiconductor wafer is mounted, the lower mold having an uneven

surface in the area, as shown in Figs. 1, 16 and 17; and the upper mold 20 including a cavity 96, 98, 20c on the main surface, and wherein the semiconductor wafer is sandwiched at its periphery by the main surface of the upper mold 20 other than an area where the cavity is formed and the lower mold whereby the resin is not formed on the periphery of the semiconductor wafer.

Regarding claim 25, Miyajima discloses that the cavity is located at a position corresponding to the area, wherein the upper mold further includes a gate, as shown in Fig. 12, connected to the cavity and cull 68 connected to the gate, wherein the gate is located at a position corresponding to the periphery of the semiconductor wafer, and where the cavity is formed deeper than the gate.

Regarding claim 26, Miyajima discloses in Fig. 12 that the width of the gate is expanding toward the cavity.

Regarding claims 27 and 28, Miyajima discloses in Figs. 10-15 that the upper mold includes an air vent 96, which is located at a position opposite to the gate, for releasing air in the cavity when the semiconductor wafer is sealed.

Regarding claim 32, Miyajima discloses in Figs. 14-17 a semiconductor device manufacturing mold for sealing a semiconductor wafer 90 having semiconductor elements on its surface by resin 50, comprising an upper mold 20; and a lower mold 21 having a first area where the semiconductor wafer is mounted, the lower mold having an uneven surface, which is formed within a second area, which is in the first area, and wherein the uneven surface is not formed in the periphery of the first area, as shown in Figs. 1, 16 and 17.

With respect to claim 33, how the uneven surface is formed has not been given patentability weight since claimed invention is directed to a device.

Regarding claim 37, Miyajima discloses in Figs. 16 and 17 that the uneven surface is formed by slits 96, 98, 76a, 98a, and 77.

Regarding claim 38, Miyajima discloses in Fig. 16 and 17 that the slits 96 and 76a are formed in parallel to each other.

Regarding claims 39 and 40, Miyajima discloses in Fig. 17 that in the sealing apparatus the area is a first area 21, the slits are formed within a second area, which is in the first area, and the slits are not extended to the periphery of the first area.

Regarding claim 41, Miyajima discloses that the uneven surface is formed by a single spiral slit 98, as shown in Figs. 16 and 17.

Regarding claim 42, Miyajima discloses in Figs. 16 and 17 that the area is a first area, the single spiral slit 98 is formed within a second area, which is in the first area, and the single spiral slit 98 is not extended to the periphery of the first area.

Regarding claim 46, Miyajima discloses in Figs. 14-17 in Figs. 14-17 a sealing apparatus for sealing a semiconductor wafer 90 having semiconductor elements on its surface by resin 50, comprising an upper mold 20; and a lower mold 21 having an area where the semiconductor wafer is mounted, and shock absorbers 78, which are formed under the lower mold 21, buffering stress from the upper mold 20 when the semiconductor wafer is sandwiched by the upper and lower molds, the shock absorbers being disposed symmetrically against the center of the area.

Further with respect to claim 46, Miyajima further teaches the shock absorbers 78 buffering stress to the semiconductor wafer, wherein a part of the shock absorber is exposed in the area.

Regarding claims 47 and 48, Miyajima discloses that the shock absorber 78 is formed by a metallic compression spring.

Regarding claims 50, 53, and 54, Miyajima discloses in Figs. 14 and 19, that the shock absorber 78 is a first shock absorber 78, and further comprising a first block 74 having a first recess, the lower mold 21 being contained in the first recess; a second block 76 having a second recess, the first block 74 being contained in the second recess; and second shock absorbers, as shown in Fig. 19

which are formed under the second block, buffering stress from the upper mold when the semiconductor wafer is sandwiched by the upper and the lower mold.

Further with respect to claims 50, and 54, Miyajima further teaches the second shock absorber, which is formed under the second block, buffering stress to the semiconductor wafer.

Regarding claims 52, and 56, Miyajima discloses that the second shock absorbers are formed by a metallic compression spring as shown in Fig. 19.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 5 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyajima.

With respect to claims 5 and 36, Miyajima teaches the lower mold has an uneven surface or roughness but fails to teach the range for the roughness.

However, it would have been obvious to one of ordinary skill in the art of making semiconductor devices to determine the workable or optimal value or range for the surface roughness through routine experimentation and optimization to obtain optimal or desired device performance because in the absence of unexpected results it has been held that it is not inventive to discover the optimum or workable ranges of a result-effective variable within given prior art conditions by routine experimentation. See MPEP 2144.05.

Claims 29-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyajima in combination with Yamamoto (US pat 6,630,374).

Miyajima discloses in Figs. 14-17 a sealing apparatus for sealing a semiconductor wafer 90 having semiconductor elements on its surface by resin 50, comprising an upper mold 20; and a lower mold 21 having an area where the semiconductor wafer is mounted, the lower mold having an uneven surface in the area, as shown in Figs. 1, 16 and 17; and the upper mold 20 including a cavity 96, 98, 20c on the main surface, and wherein the semiconductor wafer is sandwiched at its periphery by the main surface of the upper mold 20 other than an area where the cavity is formed and the lower mold whereby the resin is not formed on the periphery of the semiconductor wafer.

Miyajima discloses the claimed invention with the exception of a projection member being formed underneath the center of a back surface the lower mold, which is opposite to the uneven surface, ejection pins formed in the lower mold; the ejection pins pushing the semiconductor wafer up after the semiconductor wafer is sealed by the resin; and the ejection pins disposed symmetrically against the center of the area.

Yamamoto discloses in Figs. 1A, 2A, 2C, among others, a sealing apparatus for sealing a semiconductor wafer by resin that comprises an upper mold 1; and a lower mold 2; wherein the structure further comprises a projection member 5 being formed underneath the center of a back surface of the lower mold 2, which is opposite to a top surface where the semiconductor wafer is located; ejection pins 10 formed in the lower mold, the ejector pins pushing the semiconductor wafer up after the semiconductor wafer is sealed by the resin; and the ejection pins being disposed symmetrically against the center of the area, wherein the projection and the ejection pins are taught for the disclosed intended purpose of providing means for effectively applying resin and removing the completed resin sealed semiconductor wafer from the lower mold.

Claims 4, 35, 92, and 93 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyajima in combination with Tago (JP 2000-058571).

With respect to claims 4 and 35, Miyajima discloses in Figs. 14-17 a sealing apparatus for sealing a semiconductor wafer 90 having semiconductor elements on its surface by resin 50, comprising an upper mold 20; and a lower mold 21 having an area where the semiconductor wafer is mounted, as shown in Figs. 1, 16 and 17.

Miyajima teaches the lower mold has an uneven surface or roughness but fails to teach the range for the roughness.

However, it would have been obvious to one of ordinary skill in the art of making semiconductor devices to determine the workable or optimal value or range for the surface roughness through routine experimentation and optimization to obtain optimal or desired device performance because in the absence of unexpected results it has been held that it is not inventive to discover the optimum or workable ranges of a result-effective variable within given prior art conditions by routine experimentation. See MPEP 2144.05.

Further with respect to claims 4 and 35, Miyajima appears to fail to teach forming the wafer or substrate directly on the surface of mold or lower mold.

Tago teaches a molding apparatus in which the substrate 57 is mounted directly on a surface of lower mold 60 to prevent reduction in yield. See the English abstract and fig. 1.

It would have been obvious to one of ordinary skill in the art of making semiconductor devices to incorporate the teaching of Tago into the apparatus of Miyajima to attain the above benefit.

With respect to claims 92 and 93, how the uneven surface is formed has not been given patentability weight since claimed invention is directed to a device.

Allowable Subject Matter

Claims 43 and 44 are allowed.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Long Pham whose telephone number is 571-272-1714. The examiner can normally be reached on Mon-Frid, 10am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on 571-272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Long Pham

Primary Examiner

Art Unit 2814

LP